

What is Claimed is:

1. An apparatus for determining optical properties of cells which have been treated with a modifying material, the apparatus comprising:

a source of exciting light;

an observation unit for measuring light returning from the cells;

at least one light output element to which the source of exciting light is coupled, the at least one light output element comprising a rod or plate or a two-dimensional light output element which has a small thickness, the at least one light output element being adapted to be introduced parallel to an axis of a tooth into a periodontal pocket assigned to the tooth; and

wherein the observation unit has at least one image converter adapted to be introduced parallel to the axis of the tooth into the periodontal pocket.

2. The apparatus according to claim 1, further comprising a computer which analyzes output signals of the at least one image converters in relation to a size of image regions of different color.

3. The apparatus according to claim 1, wherein the at least one image converter is a line image converter.

4. The apparatus according to claim 1, wherein two image converters whose active areas face in opposite direction are provided.

5. The apparatus according to claim 1, further comprising:

a working head which includes at least one light output element and at least one image converter and which is displaceably carried by a base part; and

a position indicator which measures a relative position between the working head and the base part, an output signal of the position indicator being used for addressing an image store.

6. The apparatus according to claim 5, wherein the working head includes spreading means which lift walls of a periodontal pocket to be investigated away from the at least one light output element and the at least one image converter.

7. The apparatus according to claim 1, wherein a refractive index of the at least one light output element which is produced from transparent material is chosen so that diffraction and scattering losses at an interface to fluid present in the periodontal pocket are kept small.

8. The apparatus according to claim 1, wherein the modifying material is a periodontological material for modifying the optical properties of cells comprising:
a basic material;

a modification substance distributed in the basic material at a prescribed concentration, wherein the basic material comprises a viscous fluid, a gel, a two-dimensional or three-dimensional porous substrate or a material which hardens in situ;

wherein the modification substance increases the amount of protoporphyrin formed in a heme cycle; and

wherein the modification substance comprises either a substrate for enzymes which are active after 5-aminolevulinate synthase up to protoporphyrin synthesis, or an antagonist of the protoporphyrin-degrading ferrochelatase or an iron-inactivating substance.

9. An apparatus for determining optical properties of cells which have been treated with a modifying material, the apparatus comprising:

a source of exciting light;

an observation unit for measuring light returning from the cells;

at least one light output element to which the source of exciting light is coupled, the at least one light output element comprising a rod or plate or a two-dimensional light output element which has a small thickness, the at least one light output element being adapted to be introduced parallel to an axis of a tooth into a periodontal pocket assigned to the tooth;

wherein the observation unit has at least one image converter adapted to be introduced parallel to the axis of the tooth into the periodontal pocket;

a computer which analyzes output signals of the at least one image converters in relation to a size of image regions of different color; and wherein the modifying material is a periodontological material for modifying the optical properties of cells comprising:

a basic material;

a modification substance distributed in the basic material at a prescribed concentration, wherein the basic material comprises a viscous fluid, a gel, a two-dimensional or three-dimensional porous substrate or a material which hardens in situ;

wherein the modification substance increases the amount of protoporphyrin formed in a heme cycle; and

wherein the modification substance comprises either a substrate for enzymes which are active after 5-aminolevulinate synthase up to protoporphyrin synthesis, or an antagonist of the protoporphyrin-degrading ferrochelatase or an iron-inactivating substance.

10. The apparatus according to claim 9, wherein the at least one image converter is a line image converter.

11. The apparatus according to claim 9, wherein two image converters whose active areas face in opposite direction are provided.

12. The apparatus according to claim 9, further comprising:

a working head which includes at least one light output element and at least one image converter and which is displaceably carried by a base part; and a position indicator which measures a relative position between the working head and the base part, an output signal of the position indicator being used for addressing an image store.

13. The apparatus according to claim 12, wherein the working head includes spreading means which lift walls of a periodontal pocket to be investigated away from the at least one light output element and the at least one image converter.

14. The apparatus according to claim 9, wherein a refractive index of the at least one light output element which is produced from transparent material is chosen so that diffraction and scattering losses at an interface to fluid present in the periodontal pocket are kept small.